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VOL. XVI. JANUARY, 1891. NO. 1.

# THE BOTANICAL GAZETTE

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[ISSUED JANUARY 15.]

CRAWFORDSVILLE, INDIANA.
PUBLISHED BY THE EDITORS.

Tracy, Gibbs & Co., Printers, Madison, Wisconsin.

# THE BOTANICAL GAZETTE.

A Monthly Journal Embracing all Departments of Botanical Science.

**ANNUAL SUBSCRIPTION, $2.50.**

SINGLE NUMBERS, 25 CENTS.

The subscription price is an invariable one, no concession being made to dealers or agents.

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| In Great Britain, 11 shillings. | In Germany, 11 marks. |
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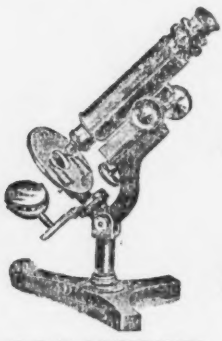

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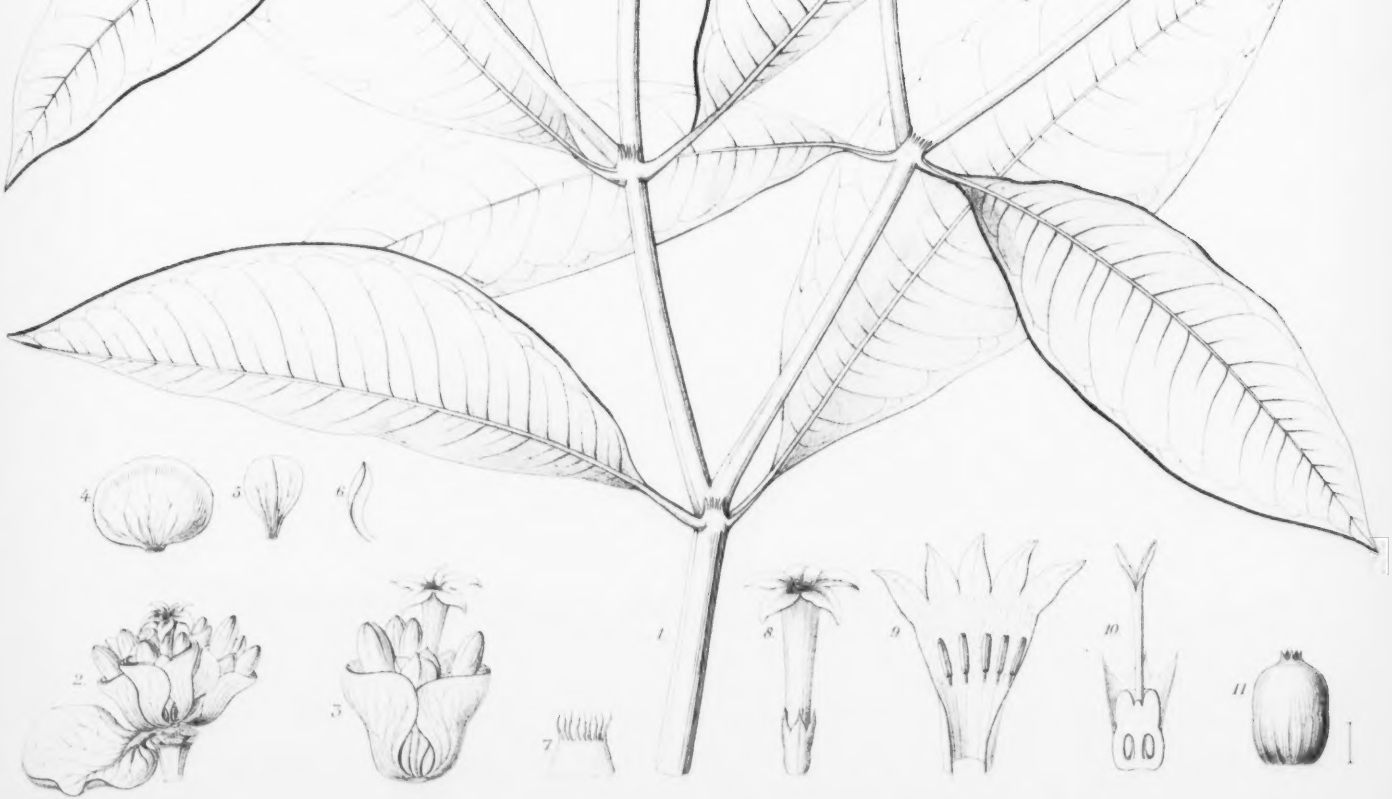


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VOL. XVI.— CRAWFORDSVILLE, IND., JANUARY, 1891. —NO. 1.

## Undescribed plants from Guatemala. VIII.

JOHN DONNELL SMITH.

(WITH PLATES I AND II.)

Prof. Alfred Cogniaux, Dr. M. T. Masters and Dr. W. O. Focke, distinguished monographers of orders, have contributed to this paper descriptions of new species detected by them among the plants submitted to them respectively for determination.

**Bocconia vulcanica.**— Branchlets, foliage and panicle smooth and shining; leaves glaucous beneath, obovate-elliptical (5–6 × 2½ in.), acute apex long-mucronate, tapering below to broadly sessile base, margin evenly glandulo-mucronate with rounded indentations: bracts foliaceous, bractlets scarious: sepals oval (6 × 3½ lines), exceeding pedicels, recurved-cuspidate: 10–15 stamens a third shorter, filaments half as long as linear anthers: stout style prolonged from ovary, a half shorter than stigmas: capsule (immature) elliptic-oblong, twice exceeding stipe.— *B. integrifolia* Humb. et Bonpl., likewise arborescent and with lobeless leaves crowded about base of large drooping panicle, is distinct by indument, long-petiolate leaves entire or nearly so, stamens equaling calyx, subsessile anthers.— Slopes of Volcan de Agua, Dept. Zacatepequez, alt. 10,000 feet, April, 1890, J. D. S. (Ex Pl. Guat. qu. edid. J. D. S. 2172.)

**Chorisia soluta.**— Calyx shortly pedunculate, 3-bracteolate, ligneous, cupulate-campanulate (20 lines long), aureolanate within, irregularly 5-lobed: petals distinct, linear-spatulate (5–6 in. × 10 lines), apex emarginate, sericeo-tomentose and fuscous without, glabrate and red within: stamens three-fourths as long; column short (10 lines), annulate at apex;

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exterior lobes one-fifth as long, ovate, entire, hirsute; interior branches 10–12, filiform, 2-antheriferous, anthers long and anfractuose: ovary free, imperfectly 5-celled, ovules pyriform.— A tree with the gigantic trunk and flat widespreading head of *Bombax Ceiba* L., and with digitate leaves. The incomplete character is drawn from the only parts within reach of the collector — freshly fallen flowers. The staminal column partite to annulus into doubled number of branches is exceptional for the genus.— Shores of Lake Amatitlan, Dept. Amatitlan, alt. 3,900 feet, Feb., 1890, J. D. S. (Ex Pl. cit. 1924.)

**Myrodia Guatemalteca.**— Leaves elliptical or obovate-elliptical (8–10×3–4 in.), abruptly acuminate, obtuse base 3-nerved, veins pubescent, axils barbate: flowers solitary or geminate, axillary and extra-axillary, approximated: calyx twice longer than deflexed minutely 3-bracteolate pedicel, sericeous within, 5–6 unequal lobes ovate (2–3 lines): petals tomentulose, elliptic-oblong (1 in.), shortly unguiculate, half-exsert: staminal column shorter, its 5 lobes regularly 4-antheriferous: cells of ovary 2, 2-ovulate, style pentagonal, stigma bilobed: immature fruit ovoid (5 lines).—*M. funebris* Benth., *ex descr.* nearly related, differs by lanceolate leaves, subsessile solitary flowers, erose calyx equalling claws of petals and twice exceeded by 25–30-antheriferous staminal column.— Pansamalá forest, Dept. Alta Verapaz, alt. 4,000 feet, Jan., 1889, v. Türckheim (Ex Pl. cit. 1410): April, 1889, J. D. S. (Ex Pl. cit. 1634.)

**Heteropteris retusa.**— Leaves short-obovate (20–24×15–18 lines), each end obtuse, apex retuse and cuspidate, sparsely pilose, veins rufo-pubescent and uni-glandular above base of lowest pair; petiole terete, bi-glandular at or below apex: panicles rufo-tomentulose, 2–3-fasciculate from axils of reduced upper leaves and terminal, umbellately compound, sub-equalling leaves; pedicels 3–5, bracteolate in middle, exceeding flowers: sepals minute: petals twice longer (2 lines), oblong, base rounded, carinate, shortly unguiculate, crimson; the interior broader with stout claw and denticulate: filaments exceeding calyx, anthers oblong, connective incrassate: styles a little shorter.—Near *H. cotinifolia* Ad. Juss., but with different leaves and glands, solitary panicles, smaller flowers, etc.— Erect shrub 8–12 feet high with brachiate lenticellate branches, along streams near Escuintla, Dept. Escuintla, alt. 1,100 feet, March, 1890, J. D. S. (Ex Pl. cit. 2068.)

RUBUS OCCIDENTALIS L., var. **grandiflora** Focke.— Differt a planta typica floribus fere duplo majoribus post anthesin nutantibus.— Slopes of Volcan de Aqua, alt. 8,500 feet, April, 1890, J. D. S. (Ex Pl. cit. 2168.)

**Potentilla Donnell-Smithii** Focke.— Caudiculi e radice multicipite breves lignosi stipulis annorum præcedentium scariosis vestiti. Caules prostrati digitales pubescentes, apice ascendentes ramosi pauciflori. Folia inferiora petiolata imparipinnata trijuga vel bijuga, foliolis approximatis, *infimis majoribus manifeste petiolulatis*, aliis lateralibus subsessilibus. Foliola inæquilatera sub-ovata inciso-serrata, serraturis confertis obtusis, utrinque appresse pilosa. Folia superiora ternata breviter petiolata, foliolis illis foliorum inferiorum similibus. Stipulæ vaginantes petiolo adnatæ, inferiores scariosæ, supremæ magna ex parte liberæ ovatæ dente uno alterove præditæ. *Flores breviter pedunculati*, pedunculo diametrum floris fere æquante, folia vix superante. *Bracteolæ calycinæ* sepalis fere æquilongæ *trilobæ* (vel inciso-tridentatæ); sepala late ovata, interdum dente uno alterove prædita. Petala obovata sepalis longiora lutea. Styli subterminales basi incrassati. Torus hirsutus.— Planta alpina humilis. Habitu ad *P. dissectam* Pursh, *P. Richardii* Lehm. et *P. Ehrenbergianam* Schldl. accedit, sed et ab his et ab omnibus aliis speciebus Americanis distinguitur bracteolis calycinis trilobis.— Bottom of crater of extinct Volcan de Agua, alt. 12,000 feet; April, 1890, J. D. S. (Ex Pl. cit. 2144.)

AGRIMONIA PARVIFLORA Ait.? var. **macrocarpa** Focke.— Differt a planta typica fructibus majoribus, foliolis paucioribus et brevioribus.— The determination is provisional. In many cases it is very difficult to trace the limits between the closely allied species of *Agrimonia*. The Guatemala specimen agrees in essential points with the *A. parviflora* of the United States. Its fruits are much larger, but show the same shape and the same direction of spines. The leaflets are less numerous and nearly as narrow, but shorter. These differences are not very important, and therefore I prefer at present to consider the plant as a variety. A more complete acquaintance, however, will perhaps disclose distinctive marks of greater importance. (Focke).— Coban, Dept. Alta Verapaz, alt. 4,300 feet, Feb., 1889, v. Türckheim. (Ex Pl. cit. 1409.)

**Tibouchina Bourgaeana** Cogn. (§ DISTANTHERA); ramis setis arcte adpressis basi tuberculatis subsparse armatis; foliis mollibus, anguste lanceolatis, longiuscule acuminatis, basi satis attenuatis, subtiliter serrulatis, utrinque adpresse pilosis, 5-nerviis, nervis lateralibus basi longiuscule coalitis; cymis plurifloris; calycis tubo ovoideo, lobis subulatis, tubo breviori-bus; staminibus omnine glabris, subaequalibus; antheris brevibus, oblongis, apice obtusis, connectivo basi brevissime producto. Rami graciles, erecti. Petiolus 0.5–1.5cm. longus. Folia 4–8cm. longa, 8–17mm. lata. Calycis tubus 2.5mm. longus; lobi 1.5–2mm. longi. Petala lilacina, ciliata, apice setoso-apiculata, 4–5mm. longa. Antherae 1.5mm. longae. Stylus 4mm. longus.—Yzabal, Dept. Yzabal, alt. 100 feet, April, 1889, J. D. S. (Ex Pl. cit. 1514).

**Monochaetum diffusum** Cogn. (§ EUMONOCHAETUM); ramis junioribus pilis patulis simplicibus eglandulosis densiuscule longeque hirtellis; foliis longiuscule petiolatis, membranaceis, oblongo-lanceolatis, acutiusculis, triplinerviis, subadpresse sparseque setulosis praecipue subtus ad nervos; cymis diffusis, plurifloris; calyce pilis patulis glandulosis sparse hirtello, lobis tubum aequantibus.—Rami graciles, obscure tetragoni, fuscescentes, satis ramulosi, diffusi. Petiolus filiformis, 4–8mm. longus. Folia supra laete viridia, subtus pallida, 3–5cm. longa, 1–1.5cm. lata. Flores rosei, longe graciliterque pedicellati. Calycis tubus cinereus, campanulatus, 4–5mm. longus; lobi patuli, triangulari-lineares, 4–5mm. longi. Petala obovata, apiculata, 6–7mm. longa. Antherae majores arcuatae, 4mm. longae, cauda paulo incrassata elongata sursum revoluta; minores subrectae, 3mm. longae, cauda subfiliformi adscendente.—Pinula, Dept. Guatemala, alt. 4400 feet, Feb., 1890, J. D. S. (Ex Pl. cit. 2217).

**Conostegia hirtella** Cogn.; ramis junioribus petiolisque setulosis; foliis oblongo-lanceolatis, basi acutis vel acutiusculis, apice longiuscule acuminatis, integerrimis vel vix undulato-denticulatis, 5-plinerviis, supra sparsissime setulosis, subtus ad nervos leviter hirtellis et vix furfuraceis caeteris glabratis; alabastris anguste obovoideis, acutiusculis, vix furfuraceis.—Rami satis graciles, obscure tetragoni, juniores densiuscule et breviuscule hirtelli. Petiolus supra densiuscule breviterque hirtellus caeteris breviter furfuraceus, 1–2.5 cm. longus. Folia membranacea, paulo disparia, 13–19 cm. longa, 4–5.5 cm. lata. Paniculae furfuraceo-hirtellae, sub-

multiflorae, fere 1 dm. longae; flores 5-meri, distincte pedicellati. Alabastra 6 mm. longa, 3.5 mm. crassa. Petala late obovata, profunde emarginate, 5–6 mm. longa. Antherae oblongo-lineares, 2.5 mm. longae. Stylus crassiusculus, 3 mm. longus, stigmate obtuso.—Pansamalá forest, alt. 3,800 feet, May 1887, v. Türckheim. (Ex Pl. cit. 1233.) Distributed as *C. lasiopoda* Benth.?

**Miconia Guatemalensis** Cogn. (§ OCTOMERIS); foliis breviuscule petiolatis, membranaceis, ovatis, breviter acuminatis, basi rotundatis vel vix emarginatis, integerrimis vel minutissime denticulatis et setulis brevissimis patulis densiuscule ciliatis, 5-nerviis, supra sparse setulosis, subtus ad nervos leviter furfuraceis caeteris brevissime subsparseque stellato-puberulis; paniculis laxiusculis, submultifloris; floribus 5-meris; calyce leviter furfuraceo, lobis brevissimis, late rotundatis.—Frutex ramis robustiusculis junioribus petiolis paniculisque brevissime et densiuscule stellato-pub erulis. Petiolus 1–4 cm. longus. Folia 6–9 cm. longa, 3. 5–5 cm. lata. Paniculae 4–8 cm. longae; pedicelli saepius vix 1 mm. longi. Calycis tubus suburceolatus, 2 mm. longus; lobi vix 1 mm. longi. Petala ut videtur rubra, 3 mm. longa. Stylus 4 mm. longus.—Tamahu, Dept. Alta Verapaz, alt. 5,000 feet, July 1887, v. Türckheim. (Ex Pl. cit. 924, 1317.)

**Miconia Tuerckheimii** Cogn. (§ OCTOMERIS); ramis junioribus petolis paniculis foliisque subtus brevissime denseque stellato-tomentosis; foliis anguste ovatis, breviter acuminatis, minute denticulatis, 7-nerviis, supra brevissime denseque villoso-hirtellis; floribus 4-meris, pedicellatis; calyce stellato-tomentoso et sparse glanduloso-piloso.— Petiolus 3–8cm. longus. Folia submembranacea, basi rotundata, 2–2.5dm. longa, 12–14 cm. lata. Paniculae 2.5 dm. longae; pedicelli glandulosi, 1–3 mm. longi. Calyx 3 mm. longus, breviter lobatus. Petala 3 mm. longa.—Coban, alt. 4,800 feet., Mch. 1881, v. Türckheim (Ex Pl. cit. 581).

*Clidemia laxiflora* Walp., var. *β.* **longipetiolata** Cogn.—Rami petioli pedunculique longiore pilosi. Petiolus 5–7 cm. longus. Folia profundiore inaequaliter serrulata. Calyx longe denseque hirsutus.—Pansamalá, alt. 3,800 feet, June 1885, v. Türckheim (Ex Pl. cit. 707). Distributed as typical.

**Clidemia Donnell-Smithii** Cogn. (§ SAGRAEA); ramis junioribus petiolisque pilis patulis elongatis pallide fulvis

dense vestitis; foliis submembranaceis, longiuscule petiolatis, oblongis vel ovato-oblongis, subintegerrimis, longiuscule acuminatis, basi rotundatis, 7-nerviis, supra breviter sparseque setulosis, subtus densiuscule longeque pilosis; cymis parvis, paucifloris; pedicellis longiusculis, minute bibracteolatis; calyce densiuscule longeque hirtello, dentibus exterioribus subulatis, tubum aequantibus.—Rami robustiusculi, teretes, simplices. Petiolus robustiusculus, 2–6 cm. longus. Folia saepius satis disparia, supra intense viridia, subtus viridi-cinerea, 10–18 cm. longa, 4.5–7.5 cm. lata. Cymae patulae, 2–3 cm. longae; pedicelli filiformes, 6–8 mm. longi; bracteolae subulatae, 1 mm. longae. Calycis tubus campanulatus, 3 mm. longus; dentes exteriores erecto-patuli, flexuosi, 2.5–3 mm. longi. Petala rubra, obovata, apice rotundata, 4–5 mm. longa. Antherae oblongo-lineares, 1.5 mm. longae. Stylus capillaris, 5–7 mm. longus, stigmate punctiformi.—Pansamalá, alt. 3,800 feet, July, 1888, v. Türckheim. (Ex Pl. cit. 1433.)

JUSSIÆA PERUVIANA L., var. **glaberrima**.—Absolutely smooth throughout: peduncle and calyx nitidous: sepals mucronate and denticulate: flowers 2 in. in diameter: stamens 8, oblong anthers equalling filaments: capsule elongated.—Shrub 12 ft. high, swamp near Dueñas, Dept. Zacatepequez, alt. 5,000 ft., Apr. 1890, J. D. S. (Ex Pl. cit. 2130.)

JUSSIÆA PILOSA H. B. K., var. **robustior**.—Densely branched shrub, 6–8 ft. high, angulate with decurrent petioles and branches: leaves crowded, small, fleshy, scabrid, sprinkled with red glands, margin rubescent: bracts minute, subulate, gland-stipellate: flowers 6-merous, sepals splitting in fruit to 7–9: seeds of one of the cells often biseriate.—Swamp on Lake Antonio near Dueñas, alt. 5,000 ft., Apr. 1890, J. D. S. (Ex Pl. cit. 2123.)

**Passiflora** (§ CIEGA) **clypeophylla** Mast.—Glabra, ramis complanatis sulcato-striatis; petiolis 20–30 mm. longis medio glandulis duabus majusculis sessilibus munitis; stipulis herbaceis lineari-subfalcatis acutis; laminis circa 6 cm. long. 10 cm. lat. glabris submembranaceis peltatis 5-nerviis subrotundis vel obscure trilobis margine incrassato albido angusto circumdato; pedunculis petiolos subaequantibus simplicibus supra medium articulatis; bracteis caducis minutis; floribus diametro 10–12 mm. tubo brevi campanulato intus

plicato; sepalis oblongis glabris; corona fauciali biseriata filamentosa, filis externis sepala subaequantibus basi purpureis apicem versus luteis, filis intimis lineari-clavatis truncatis procedentibus tertia parte brevioribus; corona media membrancea longitudinaliter plicata purpurea margine in dentes acutos inflexos margine eversos divisa, corona infra mediana annulari; gynophoro glabro; ovario globoso glabro. —Barranca del Rubelcruz, Dept. Alta Verapaz, alt. 2,500 ft., April, 1889, J. D. S. (Ex Pl. cit. 1625.)

**Passiflora** (§ DECALOBA) **allantophylla** Mast.—Setulosa, ramis herbaceis compressis sulcato-striatis; petiolis 15 mm. eglandulosis; stipulis lineari–subulatis; laminis circa 20 mm. long. 40–50 mm. lat. membranaceis glabris subtus sparse ocellatis palmatim 3-nerviis basi late cordatis vel subrotundatis, ad medium bilobatis, lobis divergentibus rotundatis nervo excurrente mucronulatis; lobulo intermedio subobsolete truncato sinu latissimo; pedunculis geminis petiolos aequantibus vel superantibus simplicibus vel superne cymoso-tribrachiatis; bracteis setaceis caducis; floribus 10–12 mm. diam., tubo brevi patelliformi basi intruso extus intusque glabro; sepalis herbaceis oblongis obtusis; petalis hyalinis albidis sepalis parum brevioribus; corona fauciali 1-seriata filamentosa, filis ligulatis flavidis basi purpurascentibus quam petala parum brevioribus; corona mediana membranacea tubulata apice in lobos acutos inflexos fimbriatulos ad margines eversos divisa; coronâ infra mediana carnosula anguste annulari; corona basilari praecedenti conformi; gynophoro glabro; ovario subgloboso glabro.—Santa Rosa, alt. 5,000 feet, Sept. 1888, v. Türckheim (Ex Pl. cit. 1425.)

**Passiflora** (§ DECALOBA) **transversa** Mast.—Glabrescens vel subhirtella; ramis complanatis sulcato-striatis; petiolis 2 cm. long. eglandulosis; stipulis subulatis herbaceis; laminis 4 cm. long. 12–13 cm. lat. subcoriaceis glabris transversim ellipticis, 3-nerviis, basi ocellatis, apice mucronulatis nonnunquam excisis; pedunculis petiolis dimidio brevioribus puberulis bracteis setaceis munitis. Floribus diametro 35 mm. tubo patulo brevi extus puberulo intus glabro; sepalis herbaceis oblongo-obtusis; petalis sepalis parum brevioribus albidis; corona fauciali filamentosa biseriali, filis extimis liguliformibus flavis petalis paulo brevioribus, filis intimis fere dimidio brevioribus; corona media membranacea tubulata superne in dentibus puberulis inflexis divisa; corona basilari carnosula

annulari; gynophoro glabro pentago; filamentis gracilibus; ovario oblongo glabro.—Masaqua, Dept. Escuintla, alt. 400 feet, April, 1890, J. D. S. (Ex Pl. cit. 2099.)

**Passiflora** (§ DECALOBA) **ornithoura** Mast.—Glabra; ramis compressis sulcato-striatis; stipulis lineari-subulatis caducis; petiolis circa 25mm. long. eglandulosis; laminis 10cm. long. 5 cm. lat. membranaceis subtus sparse ocellatis basi cuneatis vel subrotundatis, palmatim 3-nerviis infra medium bilobatis, lobis late divergentibus lanceolatis, secus nervum medianum fascia albida angusta notatis, lobo intermedio deltoideo subobsoleto; pedunculis geminis simplicibus petiolos aequantibus; bracteis minimis filiformibus acutis; floribus diametri 2cm.; tubo brevi patelliformi extus puberulo intus nitido; sepalis herbaceis oblongo-obtusis; petalis hyalinis albidis sepalis tertia parte brevioribus; corona fauciali 1-seriata e filis crassis clavatis petalis dimidio brevioribus constante; corona mediana membranacea tubulata longitudinaliter plicata margine lobata lobis lanceolatis inflexis marginibus eversis fimbriatulis; corona basilari annulari carnosula; gynophoro tereti glabro; ovario globoso glabro; fructu globoso magnitudine cerasi parvi purpureo; seminibus albidis transverse sulcatis, striisque longitudinalibus notatis.—Dueñas, alt. 5,000 feet, April, 1890, J. D. S. (Ex Pl. cit. 2136.)

**Passiflora** (§ DECALOBA) **diethophylla** Mast.—Glabra, ramis compressis striatis; petiolis circa 25 mm. eglandulosis; stipulis lineari-subulatis; laminis 5–6 cm. long. 4–5 cm. lat. membranaceis sparse ocellatis vel eglandulosis basi subcuneatis vel subrotundatis palmatim 3-nerviis, infra medium 2-lobatis, lobis divergentibus oblongis obtusiusculis, mucronulatis, sinu lunatim exciso lobulo intermedio obsoleto; pedunculis geminis petiolos aequantibus vel superantibus simplicibus; bracteis setaceis minutis munitis; floribus diametro 15 mm., tubo brevi late campanulato; sepalis herbaceis oblongis obtusis; petalis albidis sepalis dimidio brevioribus; corona fauciali filamentosa, filis uniseriatis lineari-clavatis petalis fere dimidio-breviorbus; corona media membranacea late tubulata plicata margine profunde dentata, dentibus fimbriatulis; corona infra mediana annulari crassa; gynophoro glabro; ovario globoso nitido; fructu magnitudine cerasi globoso glabro purpureo; seminibus compressis apice productis tranversim annulato striisque verticalibus notatis.—Dueñas, alt. 5,000 feet, April 1890, J. D. S. (Ex Pl. cit. 2143).

**Melothria Donnell-Smithii** Cogn. (§ EUMELOTHRIA); monoica; foliis membranaceis, ovatis vel ambitu suborbicularibus, utrinque punctato-scabris, integris vel usque ad medium 3–5-lobatis, lobis apice saepius rotundatis terminali interdum acuto; cirrhis simplicibus; racemis masculis saepius 3–5-floris, petiolo brevioribus; petalis leviter emarginatis; antheris subquadratis, loculis paulo arcuatis, connectivo lato; floribus femineis longe pedunculatis, fructu majusculo, triloculari, concolore; seminibus immarginatis.—Rami graciles, elongati, glabri vel vix pilosuli, laeves, alternatim albo et viridi longitudinaliter striati. Petiolus satis gracilis, brevissime subsparseque hirtellus vel glabratus, 2–5 cm. longus. Folia ovata, integra vel saepius paulo lobata, apice acuta, 6–8 cm. longa, 5–7 cm. lata, supra intense viridia, subtus paulo pallidiora et ad nervos interdum brevissime hirtella, margine minute remoteque denticulata; sinus basilaris saepius angustus, 1–1.5 cm. profundus. Cirrhi graciles, sulcati, glabri. Pedunculus communis masculus gracilis, puberulus, 1.5–3 cm. longus, apice 2–15-florus; pedicelli 3–10 mm. longi. Calyx campanulatus, basi obtusus, glaber, 3 mm. longus, minute denticulatus. Corolla tenuissime furfuracea, fere 1 cm. lata, segmentis patulis. Antherae ciliatae, 1 mm. longae. Flores feminei solitarii. Pedunculus fructiferus filiformis, 2–6 cm. longus. Fructus ovoideus, 3.5–4 cm. longus, 2.5 cm. crassus. Semina pallida, ovata, 3.5–4 mm. longa, 2–2.5 mm. lata. Species *M. scabrae* Naud. (Cogn. in DC. Monogr. Phan. III, 582) proxima.—Masagua, alt. 400 feet, April, 1890, J. D. S. (Ex Pl. cit. 2203).

Var. *β.* **hirtella** Cogn.—Rami sparse hirtelli. Petiolus densiuscule hirtellus, 3–7 cm. longus. Folia ambitu late ovata, plus minusve lobata, apice saepius obtusa.—Escuintla, alt. 1100 feet, March, 1890, J. D. S. (Ex Pl. cit. 2206).

Var. *γ.* **rotundifolia** Cogn. Rami petiolique ut in typo. Folia ambitu suborbicularia, saepius satis profunde 5-lobata, lobis apice rotundatis.—San Luis, Dept. Escuintla, alt. 1,000 feet, Mch. 1890, J. D. S. (Ex Pl. cit. 2,208).

**Anguria oblongifolia** Cogn.; tota glaberrima; foliis breviter petiolatis, integris, oblongis, vix acuminatis, basi acutis, regulariter penninervis; floribus parvis, sessilibus, ad apicem pedunculi communis capitatis; antheris rectis, oblongis, tubo calycis paulo brevioribus, appendice vix perspicua leviter papillosa coronatis.—Rami graciles, laeves, simplices, elongati, striati. Petiolus gracilis, 2–3 cm. longus. Folia tenuiter

membranacea, laete viridia, utrinque laevia, margine integerrima vel vix undulata, 10–13 cm. longa, 5–6 cm. lata; nervi tenues, subtus vix prominentes. Cirrhi graciles, longiusculi, tenuiter striati. Pedunculus communis masculus gracilis, 2.5 dm. longus, apice 8–10-florus. Calycis tubus anguste oblongus, basi rotundatus superne satis constrictus, teretiusculus, 8 mm. longus; dentes lanceolato-lineares, erecto-patuli, 1 mm. longi. Petala suborbicularia, uninervia, extus tenuiter furfuracea, 3 mm. longa. Antherae 5 mm. longae, 1.5 mm. latae. Flores feminei et fructus ignoti. Species *A. longipedunculatæ* Cogn. (Monogr. Phan. III, 673) proxima.—Rio Dulce, Dept. Livingston, sea level, Mch. 1889, J. D. S. (Ex Pl. cit. 1510).

**Anguria diversifolia** Cogn. (§ V. ANTHERAE MUTICAE); tota glaberrima; foliis breviter petiolatis, simplicibus, trinerviis, modo integris vel vix trilobatis anguste ovatis acutis basi oblique subtruncatis, modo fere usque ad basim tripartitis segmentis lanceolatis breviter acuminatis inferne contrictis; floribus parvis, sessilibus, ad apicem pedunculi communis breviter spicatis subcapitatis; antheris oblongis, rectis, muticis.—Rami satis graciles, laeves, sulcati, paulo ramulosi. Petiolus gracilis, 1–2.5 cm. longus. Folia membranacea, laete viridia, utrinque laevia, margine integerrima, 8–14 cm. longi; nervi crassiusculi, subtus leviter prominentes. Cirrhi crassiusculi, elongati, inferne sulcati. Pedunculus communis masculus robustiusculus, sulcatus, 2–3.5 dm. longus, apice 10–25-florus. Calycis tubus anguste oblongus, basi subacutus, superne valde constrictus, teretiusculus, 10–11 mm. longus; dentes lineares, erecto-patuli, 2 mm. longi. Petala obovata, extus dense furfuracea, 5–6 mm. longa. Antherae 4–5 mm. longae, 1.5 latae. Flores feminei et fructus ignoti.—Pansamalá, alt. 3,800 feet, November, 1888, v. Türckheim (Ex Pl. cit. 1414.)

**Gurania Donnell-Smithii** Cogn.; foliis ambitu suborbicularis, basi profunde emarginatis, usque ultra medium trilobatis, lobis anguste ovatis, abrupte longiuscule angusteque acuminatis; calycis tubo breviusculo, ovoideo, tomentoso-cinereo, segmentis subulatis, uninerviis, rubrocinereis, utrinque densiuscule breviterque puberulis, tubo duplo longioribus; antheris late-oblongis, inferne replicatis, connectivo lato, apice appendiculato.—Rami robusti, sulcati, densiusculi et breviuscule hirtelli. Petiolus robustus, striatus, longiuscule

denseque villosus, 8–10 cm. longus. Folia membranacea, utrinque breviuscule sparseque pilosa praecipue subtus ad nervos, supra intense viridia, subtus satis pallidiora, margine remote spinuloso-denticulata, 2.5 dm. longa lataque; lobi exteriores paulo breviores, terminalis basi satis constrictus; nervi robusti, utrinque paulo prominentes, duo laterales basilares trifurcati, imum sinum marginantes; sinus basilaris 5 cm. profundus. Cirrhi robusti, sulcati, breviusculi villosi. Pedunculus communis masculus robustus, striatus, densiuscule breviterque villosus, 3.5–4 dm. longus, apice 30–40-florus; flores subsessiles. Calycis tubus 8–10 mm. longus, 6–7 mm. latus; lobi erecti, 1.5–2 cm. longi. Petala conniventia, linearia, acutiuscula, extus furfuracea, 6–7 mm. longa, vix 1 mm. lata. Antherae 5 mm. longae, 2 mm. latae, connectivo glabro, apice in appendicem papillosam 1 mm. longam producto. Flores feminei et fructus ignoti. Species *G. Levyanae* Cogn. (l. c. 686) proxima.—Rio Chactá, Dept. Alta Verapaz. alt. 2.500 feet, April 1889, J. D. S. (Ex Pl. cit. 1511.)

**Sicyos longisepalus** Cogn. (§ EUSICYOS); foliis longiuscule petiolatis, ambitu cordato-ovatis, angulato 5-lobatis, utrinque punctato-scabris, lobis triangularibus, nervis lateralibus imum sinum non marginantibus; cirrhis bifidis; racemis masculis simplicibus, 8–20-floris, folio longioribus; calycis dentibus elongatis; pedunculis femineis apice 3–4-floris; fructu ovoideo, satis compresso, acuto vel obtusiusculo, vix puberulo et setis elongatis persistentibus subsparse vestito.—Rami graciles, sulcati, subglabri. Petiolus robustiusculus, striatus, brevissime puberulus, 3–7 cm. longus. Folia tenuiter membranacea, intense viridia, margine remote vix denticulata, 8–12 cm. longa, 7–10 cm. lata, lobis lateralibus brevibus, acutiusculis, terminali majore, acutissimo; nervi vix prominentes, supra vix puberuli; sinus basilaris acutus, 1–3 cm. profundus. Cirrhi robustiusculi, elongati, striati, glabrati. Pedunculus communis masculus gracilis, striatus, brevissime puberulus, 1–2.5dm. longus, superne vel fere usque ad medium floriferus; pedicelli filiformes, demum reflexi, 5–10 mm. longi. Calycis tubus subrotatus, vix puberulus, 5 mm. latus; dentes patuli, lineari-subulati, 4 mm. longi. Corolla spureo-alba, vix puberula, segmentis patulis, late ovato-triangularibus, obtusiusculis, 5–7 nerviis, 4 mm. longis. Pedunculus fructiferus 3 cm. longus. Fructus basi rotundatus, 8–10 mm. longus; setae 3–6 mm. longae. Species

*S. Deppei* G. Don (Cogn. l. c. 876) proxima.—Antigua, Dept. Zacatepequez, alt. 5,000 feet, April, 1890, J. D. S. (Ex Pl. cit. 2202.)

**Cephaelis glomerulata** (§ CEPHAELIDEÆ Muell. Arg. in Fl. Brasil.)—Dichotomous, glabrous: stipules solitary, triangular-truncate, apex fimbriate: leaves oval-lanceolate (4–5 × 1½–2 in.), acuminate, base acute, patent secondary nerves about 14 uniting in marginal arches: heads of bracteose glomerules subsessile, semi-globose (9 lines high, 1 in. broad); bracts coriaceous, pallid, margin virescent or violaceous, the 6–8 exterior oblate-roundish, of glomerules obovate passing into shorter spatulate membranaceous conduplicate bractlets: calyx scarious (1½ line), two-thirds free, unequally subulate-toothed: corolla white, half-exsert from bractlet, slender (6 lines), one-fourth-lobed, upper half cano-pubescent within: anthers (2 lines) exceeding filaments: bi-lobed disk equalling ovary; drupe ovoid (3 lines), sulcate, blue.—Shrub 3–4 ft. high with habit and leaves of *C. dichotoma* Rudge and *Psychotria Martiana* Muell. Arg., but differing from both by developed bractlets of glomerules and of flowers.—Swampy woods on Rio Dulce, sea-level, Mch. 1889, J. D. S. (Ex Pl. cit. 1637).

EXPLANATION OF PLATE I.—Fig. 1, flowering branch. Fig. 2, head with all but one of the bracts removed. Fig. 3, glomerule. Fig. 4, exterior bract. Fig. 5, exterior bractlet. Fig. 6, interior bractlet. Fig. 7, stipule. Fig. 8, flower. Fig. 9, corolla of long-styled flower laid open. Fig. 10, vertical section of short-styled flower with corolla removed. Fig. 11, drupe. (Figs. 1 and 2 are natural size; the others are variously magnified.)

LOBELIA LAXIFLORA H. B. K., VAR. **insignis**.—Glabrous in every part: stem simple, stout, 3–4 ft. high: leaves densely confert, linear-lanceolate (7 × 1 in.), sessile, glandular teeth appressed: peduncles bractless, nearly equalling leaves: flowers 2 in. long: calyx-segments one-fifth as long, linear, twice exceeding tube: corolla carinately nerved; tube half as broad as long, yellow varied with red; divisions of upper lip red on both sides; lower lip plicate, half as broad as long, yellow margined with red.—Mr. Hemsley refers to the type a plant collected by Salvin in similar locality. The congested large leaves and flowers impart a distinct habit.—Slopes of Volcan de Agua, alt. 10,000 feet, April, 1890, J. D. S. (Ex Pl. cit. 2173.)

MACLEANIA CORDATA Lemaire, var. **linearifolia**.—Leaves obscurely penninerved, above conspicuously reticulated, linear-lanceolate (4–5 × ½–¾ in.), regularly tapering from

rounded base to acute mucronulate apex.— Pansamalá forest, alt. 4,000 feet, July 1887, v. Türckheim (Ex Pl. cit. 1332.)

ARCTOSTAPHYLOS PUNGENS H. B. K., *(not Gray)*, var. **cratericola.**— Younger parts and racemes puberulous: branchlets trigonal from stout short (1 line) petioles: leaves crowded, smooth and shining, punctate beneath, oval or obovate (6–7 × 4–5 lines), each end obtuse, apex callose: capituliform racemes scarcely equalling leaves, 4–6-flowered, coloured bracts exceeding abbreviated pedicels: filaments circularly dilated at middle, chiefly beardless; anthers nearly half as long, equalling short smooth awns: style exceeding stamens.— Tufted, with prostrate branches a foot or more long, on rocks in the crater of Volcan de Agua, alt. 12,000 feet, April 1890, J. D. S. (Ex Pl. cit. 2159.)

SOLANUM OLIVÆFORME, Botan. Gazette, XIV. 28, XV. 28.

EXPLANATION OF PLATE II.— Fig. 1, portion of a plant in flower. Fig. 2, portion of a plant in fruit. Fig. 3, vertical section of flower. Fig. 4, stamen. Fig. 5, pistil. Fig. 6, transverse section of fruit. Figs. 1 and 2 are natural size; the others are variously enlarged.

**Daphnopsis Tuerckheimiana** (§ NORDMANNIA Benth. et Hook.) — Epiphytal (?), dichotomous: petioles short, incrassate; leaves coriaceous, glabrous, ovate-lanceolate or lanceolate (3–5 in.), caudately produced, base acute, margin revolute, veins immersed: umbelliform staminate fascicles lateral and terminal, subsessile, bracteate, pilose, 5–7-flowered, pedicels short: perianth 5–6-times longer (3½–4 lines), clavate, smooth within, lobes one-fifth as long with alternate ones the broader: superior stamens partly exsert, interior inserted above middle of tube: abortive ovary hirsute, globose, equalling style, ovule manifest; stipe long as pistil (½ line); scales as long, united in cylindrical dentate sheath splitting variously: fertile flowers not seen.— Inflorescence apparently similar to that of a recent Brazilian species, *D. Sellowiana* Taubert, Bot. Jahrb. XII, Beibl. 7, which seems incorrectly referred to the section NEIVIRA Griseb.—Pansamalá forest, alt. 3,800 feet, Sept. 1886, v. Türckheim. (Ex Pl. cit. 1039.)

MYRIOCARPA LONGIPES Liebm., var. **Yzabalensis.**— Leaves round-oval, abruptly cuspidate, petioles from a third to nearly as long and like veins strigillose: branches of pistillate inflorescence 2–3, twice dichotomous, flowers sessile: achenia black and shining, scabrid with sparse short hairs: stigma

conspicuous.—Shrub 6–8 ft. high, Monte Cachirulo, Dept. Yzabal, alt. 900 ft., Apr. 1890, J. D. S. (Ex Pl. cit. 1644).

**Triuris brevistylis.**—About 3 in. high, aphyllous: inflorescence uniparous, twice furcate, peduncles $\frac{1}{2}$–1 in. long, semi-amplexicaul bracts with rounded lobes at base: perianth-segments with twice longer appendages 3–4 lines long: styles pubescent, sub-terminal, capillary, deflexed, shorter than obtuse carpels of ovary; stigma oblique; fruit obovate, puberulous.—*T. diaphana* Miers, one-third as large, with cauline leaves, sheathing entire bracts, less developed inflorescence, is distinguished best by carpels elongated into terminal subulate styles.—On decayed trunks of trees, Pansamalá forest, alt. 3,800 feet, Sept. 1888, v. Türckheim (Ex Pl. cit. 1384).

NEPHRODIUM DUALE, described as new, BOT. GAZ., XV. 29, must be referred to *Aspidium ascendens* Hew., which in view of the distinctly reniform involucre of the present specimens may be better designated as *Nephrodium ascendens*. It has been known hitherto only from Jamaica.

*Baltimore, Md.*

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## On certain new or peculiar North American Hyphomycetes. I.

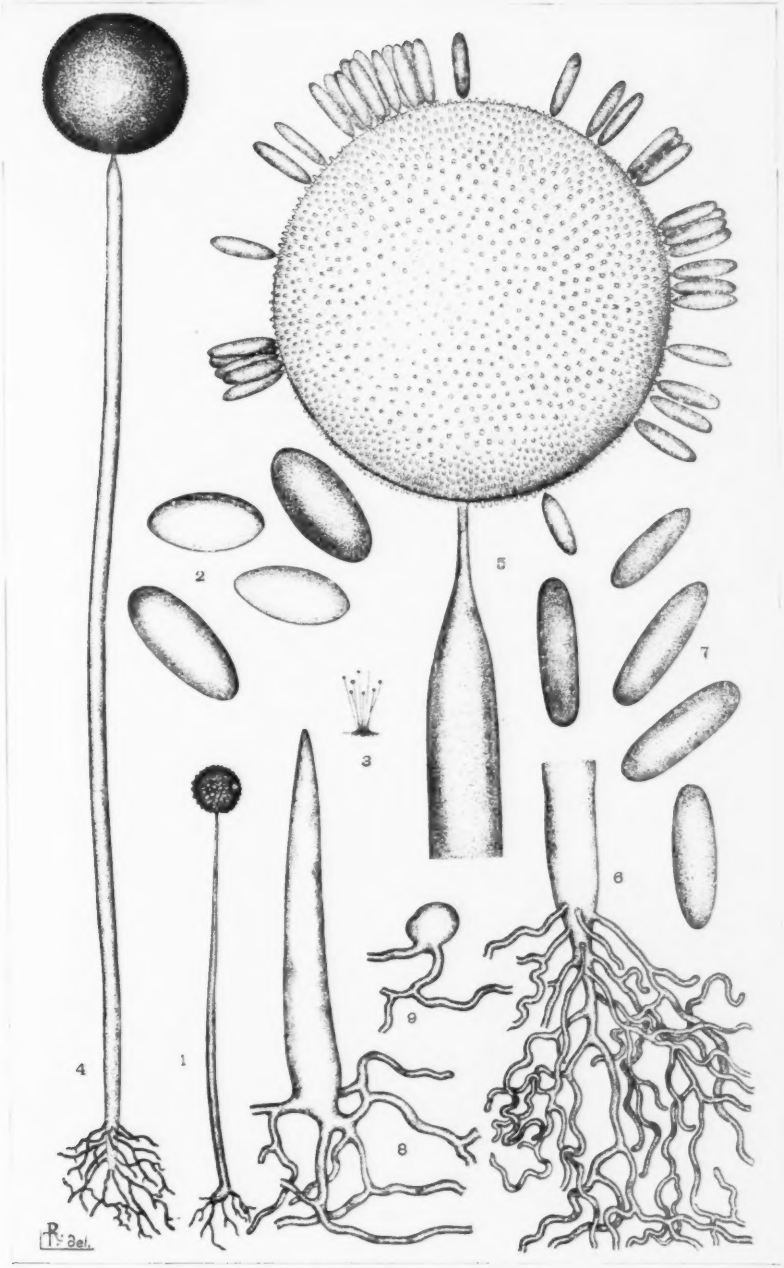
### Oedocephalum, Rhopalomyces and Sigmoideomyces n. g.

ROLAND THAXTER.

(WITH PLATES III AND IV.)

The species included in the above genera, although the similarity in their general type of fructification may justify their association for convenience as imperfect forms, must be considered as representatives of several widely different groups of so-called perfect fungi. Although in the plant subsequently described as a new genus there is at present no indication of any definite relationship to some higher form, there exists in the case of Rhopalomyces a probable connection with the Zygomycetes, as has been suggested by Van Tieghem,[1] while in Oedocephalum, a somewhat heterogeneous

[1] Bull. d. l. Soc. Bot. d. France, 1886, p. 494.

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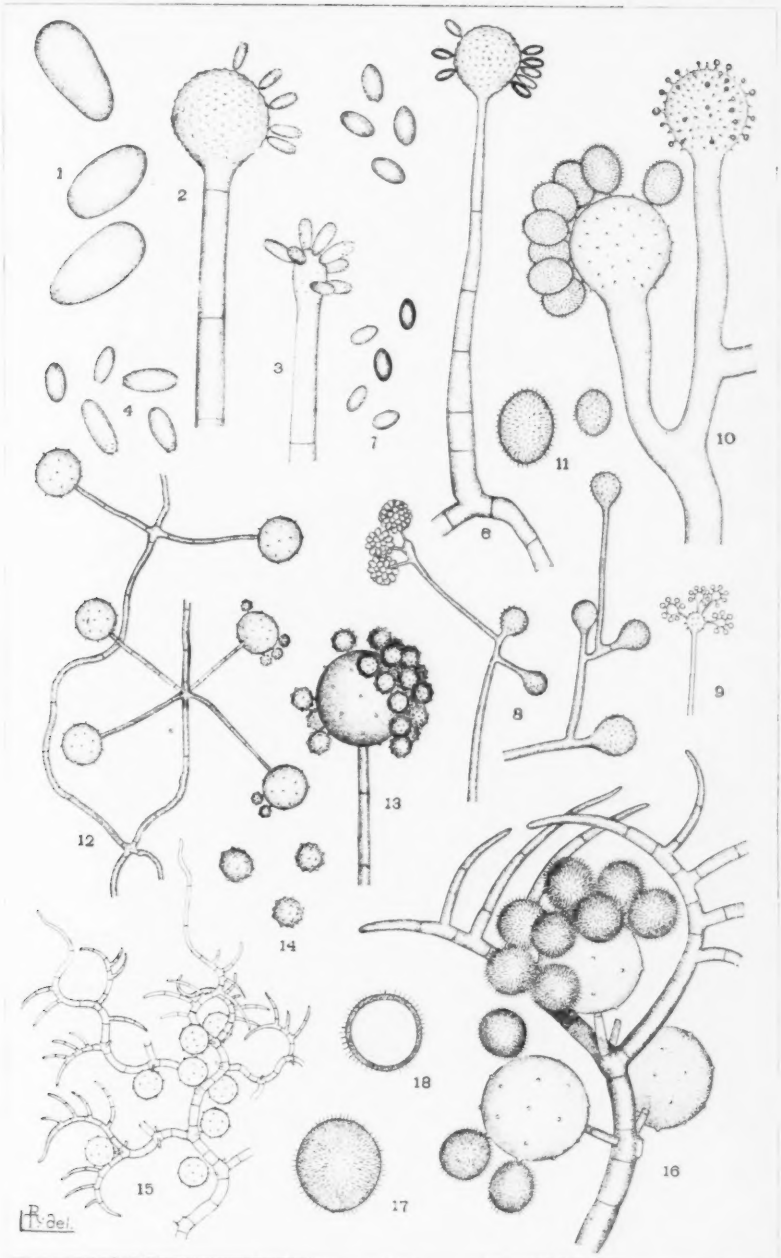


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collection of species, we must accept the studies of Vuillemin and Brefeld as proving a connection both with the Discomycetes and the Basidiomycetes. The first named author[1] in his cultures of a Peziza, which he calls *Alcuria asterigma* has clearly established its connection with an Oedocephalum (*O. fimetarium* Riess) found growing in company with it and also developed directly from germinating ascospores. Brefeld,[2] on the other hand, in cultivating the basidiospores of *Polyporus annosus*, in nutrient solutions, has obtained from them a hyphomycetous fungus which, although it is compared to Aspergillus in the text, and is subject to unusual variations when artificially cultivated, is in all essentials an Oedocephalum, and not referable to any other described genus.

No such proof of the connection of Rhopalomyces with the Zygomycetes has as yet been obtained; but its Syncephalis-like habit and mode of growth, together with the occurrence of supposed acroconidia, which have been observed by Van Tieghem and are similar to those which accompany the species of Syncephalis and Mortierella, give force to this supposition.

Costantin,[3] in his excellent synopsis of the simple Mucedines and elsewhere,[4] first clearly distinguished Rhopalomyces from Oedocephalum, restricting the former genus to a small number of species all characterized by the extreme differentiation existing between the fertile and the sterile hyphae; the almost complete absence of septa, and the large dark-colored conidia. The presence of areolations upon the surface of the fertile head was formerly considered as distinctive of Rhopalomyces, and this definition is adhered to by Saccardo in the Sylloge,[5] although the same character is, as was pointed out by Harz in his well known paper,[6] distinctly present in so typical a species as *Oedocephalum glomerulosum*. It may be mentioned that the last named author recognized neither Oedocephalum nor Rhopalomyces as distinct genera, referring both to *Haplotrichum* Lk. emended to receive them: an error

[1] Sur le Polymorphism des Pezizes: Ass. Franc. p. l'Avan. d. Sci., Congres d. Nancy, 1886.

[2] Untersuchungen, VIII Heft, Basidiomyceten III, p. 169, Taf. X, XI.

[3] Les Mucedinees Simples. Materiaux p. l'Histoire d. Champignons. (Paris, 1888) Vol. II., p. 37.

[4] Bull. d. l. Soc. Bot. d. France, 1886, p. 492.

[5] Sylloge Fungcrum, Vol. IV., p. 50.

[6] Einige Neue Hyphomyceten Berlin's und Wien's p 120, Plate I, fig. 1 c. d.

which becomes manifest in the light of a more extended knowledge of existing forms.

In enumerating the American species of these two genera, the writer has therefore restricted Rhopalomyces as above defined, referring to Oedocephalum those species which are characterized by the presence of fertile hyphae nearly approaching the sterile in size or at least not supplied with rhizoid-like basal outgrowths for support, and as a rule, distinctly septate.

The forms at present recorded from this country appear to be confined to two species, *Rhopalomyces cucurbitarum* Rav. and *R. cervinus* Cke. In Europe, however, the number described is considerable, although the identification of many of them is beset by the difficulties which are usually associated with wretched figures, or diagnoses without measurements or mention of allied species for purposes of comparison. Since it is often somewhat difficult to form any opinion concerning them from the description alone, a brief synopsis of all described forms is here appended, which may perhaps be found of value in this connection:

## **Oedocephalum** PREUSS.

OEDOCEPHALUM GLOMERULOSUM (Bull.) Sacc. Plate IV, fig. 1.

*Oedocephalum glomerulosum* Saccardo, Sylloge Fungorum, Vol. IV., p. 47. Costantin: Les Mucedinees Simples, p. 39, fig. 6. Berlese, Fungi Moricoli, III., N. 2, fig. 1–5.

*Mucor glomerulosus* Bulliard: Herbier d. l. France, Pl. 504, fig. 3.

*Haplotrichum glomerulosum* Harz: Einige Neue Hyphomyceten Berlin's und Wien's, p. 120, Taf. 1, fig. 1. Saccardo: Fungi Italici, Pl. 804.

*Haplotrichum roseum* Corda: Prachtflora, p. 23, Taf. XI. Icones Fung. II., Taf. 2, fig. 28.

Varying in color from nearly white to rose colored or yellowish. Sterile hyphae creeping, much branched and septate, about 6$\mu$ in diam. Fertile hyphae erect, solitary, tapering slightly upwards, septate, 8–9$\mu$ in diam. 200–350$\mu$ in height. Sporiferous heads spherical to obovoid, 35–50$\times$25–45$\mu$: average 30$\times$38$\mu$; often distinctly areolate. Spores oblong to obovoid, slightly pointed at the base and broader at the distal end, 9$\times$18$\mu$, maximum 10$\times$30$\mu$.

On old paper, decaying vegetable matter, dung of various animals. Massachusetts, Connecticut.

This species occurs very commonly on a great variety of substrata and is often troublesome in laboratory cultures,

completely occupying them to the exclusion of other and perhaps more desirable fungi. It varies from a decided rose or flesh color, which it often imparts to the substratum on which it grows, to pale whitish or yellowish: the color depending, in part at least, upon the amount of light to which it is exposed, and to the character of the substratum. The simple fertile hyphae also vary greatly in length and in the number of the septa, which may be almost wholly wanting. The areolation of the heads is distinct or otherwise, according to their condition of maturity, as well as to the illumination used in examining them.

In view of the observations of Vuillemin in connection with his *Aleuria asterigma* already referred to, it may be of interest to note that in several cultures made by the writer, that had been allowed to run for several weeks, there appeared repeatedly at various points on the old paper on which the fungus grew luxuriantly, a number of small Pezizae, flesh colored or whitish, about six millimeters in diameter and apparently developed from the same mycelium which gave rise to the Oedocephalum. Although asci were produced, no ascospores matured in them, so that cultures were impossible and no proof of the connection between the two forms was obtainable.

Saccardo in the Sylloge follows Harz in considering *O. elegans* Preuss a synonym of this species. The description and figure of *elegans*, however, which is given in Sturm, seem to indicate that the two are quite distinct: Preuss' species resembling *O. pallidum* (B. & Br.) in many respects. Whether Harz is correct in assuming that the present species is synonymous also with *O. album* and *O. alienum* of Preuss must remain uncertain, since these two species are hardly recognizable from either the figures or descriptions. The spherical spores described by Preuss, however, seem to separate both from *glomerulosum*, and Saccardo is doubtless right in keeping them distinct.

The *Oedocephalum roseum* Cooke, judging by the description and figure in Grevillea, can hardly be separated from the present species, of which it may be merely a short-stemmed variety.

**Oedocephalum echinulatum** n. sp.—Plate IV, figs. 8–11.

White becoming slightly yellowish. Sterile and fertile hyphae not clearly differentiated, the latter more or less irregularly and indefinitely branched. Fertile heads nearly

spherical to obovoid, very variable in size, more or less distinctly areolate: maximum $45\times65\mu$; average $28\times35\mu$. Spores oval to elliptical, finely echinulate: average $10\times12\mu$; maximum $18\times25\mu$.

On cheese and cheesy paper. Massachusetts.

This species, which made its appearance in company with several Mucors on a laboratory culture, is readily distinguished by its finely echinulate spores and very irregular growth. It resembles *O. dichotomum* Preuss in the successive branching of the fertile hyphae; but the type is not dichotomous, new heads usually arising by an out-growth from a point below the last head formed as in fig. 8. In some of its irregularities it approaches the conidial form of *Heterobasidion annosum* Bref. previously referred to, especially in the common occurrence of compound proliferation from the fertile heads, either before or after they have produced spores; each proliferation in its turn producing a smaller head and smaller spores as in fig. 9.

**Oedocephalum verticillatum** n. sp.—Plate IV, figs. 12–14.

White, becoming faintly yellowish. Sterile hyphae creeping, frequently septate, sub-verticillately branched. Fertile hyphae arising in whorls of from one to five; septate; $4\mu$ in diam., tapering very slightly before swelling suddenly into the sporiferous head. Head invariably spherical; very faintly areolate; $20–25\mu$ in diam. Spores muriculate, spherical, slightly irregular in outline, $5–7\mu$ in diam.

On newt s dung. E. Tennessee.

This delicate species covers the substance on which it grows with an extremely evanescent mycelium; the hyphae running from one projecting point of the substratum to another and producing the fertile branches in the interval. The latter, therefore, arising in whorls in a usually vertical plane, are not always erect, some pointing downwards or outwards as well as upwards. The species does not appear nearly related to any of the described forms, from all of which it is readily separated by its verticillate habit and spherical muriculate spores.

OEDOCEPHALUM PALLIDUM (B. & Br.) Cost., Plate IV, figs. 2–7.

*Oedocephalum pallidum* Costantin Bull. Bot. Soc. d. France, Vol. XXXIII, p. 492.

*Rhopalomyces pallidus* Berkeley & Broome, Annals and Mag. of Nat. Hist., 2d Ser., Vol. VII, p. 96, No. 504, Plate V, fig. 2.

*Rhopalomyces candidus* Berkeley & Broome, l. c. p., 96, No. 505. Pl. V, fig. 3.
*Haplotrichum fimetarium* Riess in Fresenius Beitr. z. Mycol., III. p. 105, Taf. XIII, figs. 59–65.
*Oedocephalum fimetarium* Saccardo, Sylloge Fung., IV. p. 48.
*Rhopalomyces cervinus* Cooke, Grevillea, Vol. XII, p. 27. Ravenel, Fung. Amer., 574. Ellis N. A. F., No. 658.
*Aleuria asterigma* Vuillemin Ass. Franc. p. l'Avan. d. Sci. Congrès d. Nancy, Aug. 1886, Vol. XV, Pl. X.

Clear white, becoming brownish yellow to fawn-colored. Sterile hyphae creeping, septate: fertile hyphae erect, simple or once dichotomously branched. Fertile heads nearly spherical to obovoid, more or less distinctly areolate, 20–30$\mu$ in diameter. Spores oval or elliptical, sometimes slightly roughened toward the apex, 6–10×4–16$\mu$.

On old paper, decaying wood, dung of various animals, etc. Mass., Conn., N. Carolina, Europe.

This species occurs very commonly on laboratory cultures as well as old paper in refuse heaps. In one instance only I have found it covering the under side of a charred and decaying log in shady woods, with its fawn-colored fructification. The form on dung which corresponds to the *Haplotrichum fimetarium* of Riess, is usually smaller than the others, as far as I have observed, the spores not often reaching the length (10.7$\mu$) given by Fresenius; and usually measuring about 8$\mu$ or less.

The synonymy of the species is somewhat confused, yet that given above is I believe correct. Through the kindness of Mr. Massee, to whom I am greatly indebted for sketches, with measurements of the types of *Rhopalomyces pallidus* and *candidus* B. & Br., the identity of these two supposed species is established beyond question, *R. candidus* having been based upon the different appearance which distinguishes immature from the mature individuals of *R. pallidus*. Again, *Haplotrichum fimetarium* Riess is separated by Fresenius from *R. pallidus* merely on the ground that its head showed no areolation. Since, however, this character is quite unreliable, being distinct or invisible, according to the condition of the head when examined, it cannot possibly be considered as a valid reason for keeping the two distinct. As a matter of fact the heads of the form on dung are often distinctly areolate. As Costantin has pointed out[1], the conidial form associ-

[1] Les Mucedinees Simples, p. 39.

ated with Vuillemin's "*Aleuria asterigma*" must also be added to the list. *Rhopalomyces cervinus* Cooke, as distributed in Ellis N. A. Fungi, No. 658, by Ravenel, and therefore presumably authentic, is identical with the common form on dung, and the diagnosis in Grevillea also mentions no point of difference. Whether *O. elegans* Preuss may not be the same, must necessarily remain in doubt, although the figures and description in Sturm's Flora apply quite well to the present species, and are sufficiently definite at least to distinguish it with certainty from *O. glomerulosum.*

## **Rhopalomyces** CORDA.

RHOPALOMYCES ELEGANS Corda.—Plate III, figs. 1–2.

*Rhopalomyces elegans* Corda Prachtflora, p. 3, Taf. 2. Anleit. z. Stud. d. Mycol. p. LXVI, Taf. B. 20, figs. 1–3. Fresenius Beitrage z. Mycol. I, p. 19, Taf. III, figs. 9–15. Bonorden Handbuch d. Allg. Mycol. p. 113, Taf. IX, fig. 184.

*Haplotrichum elegans* Harz: Einige neue Hyph. Berl. u. Wien's p. 118, Taf. V, fig. 5.

Sterile hyphae creeping, much branched, very rarely septate, 3–4 $\mu$ in diam. Fertile hyphae erect, more or less gregarious, colorless or slightly tinted, supported by rhizoids at the base which is usually slightly swollen, nearly cylindrical or tapering towards the apex, 1.5–0.75 mm. high, 18 $\mu$ in diam. Head nearly spherical, usually distinctly areolate, 50–80 $\mu$ in diam. Spores about 100 in number, dark-brown, ovoid to sub-cylindrical, slightly pointed at the base, 35–55 $\times$ 11–22$\mu$.

On vegetable and animal matter of various kinds; bones, dung of animals, potatoes, squash rind, etc. Connecticut.

This well known species has occurred very frequently at New Haven on a variety of substances, although it is cultivated with difficulty, and I have been unable to induce the spores to germinate even in nutrient solutions. The spores vary considerably in size and shape and are usually nearly oval or long oval, seldom presenting the very elongate almost cylindrical form figured by Corda.

The supposed acroconidia described by Van Tieghem and resembling the similar productions of Morthierella and Syncephalis I have never seen.

RHOPALOMYCES CUCURBITARUM Berk. & Rav.

*Rhopalomyces cucurbitarum* Berkeley & Ravenel, Grevillea, Vol. III, p. 109.

"Hyalinus; floccis inarticulatis; capitulis globosis echinulatis: sporis obovatis ovatisque."

On putrid squashes, Lower Carolina.

The exhaustive diagnosis above quoted has led to some uncertainty concerning this form, which, however appears to be a true Rhopalomyces and probably a distinct species.

Mr. Massee has kindly sent me a sketch from Berkeley's type with measurements which show that it is perhaps too closely allied to *R. elegans*, differing chiefly in its much smaller size. The creeping mycelium consists of the usual fine aseptate hyphae, from which the large, erect, fertile hyphae arise. The spores are represented as reddish brown, ovoid, slightly pointed at the base, and the head as spherical. The following measurements are noted: fertile hyphae 170–200$\mu$ high by 10–12$\mu$ in diam.: head 40–50$\mu$ in diam.: spores 18–20 $\times$9–10$\mu$. It will be observed that these measurements hardly come within the limit of variation which *R. elegans* may be supposed to exhibit, and it is therefore necessary to consider the species distinct until more information concerning it can be obtained.

**Rhopalomyces strangulatus** n. sp.—Plate III, figs. 3–9.

Sterile hyphae copious, much branched and rarely septate, 4$\mu$ in diam. Fertile hyphae densely gregarious, supported by numerous rhizoids, pure white, cylindrical, 2–8 mm. high, (average 7.5 mm.) by 40–50$\mu$ in diam., suddenly constricted below the head with which it is connected by a narrow neck 8$\mu$ in diam. Head perfectly spherical, more or less distinctly areolate, beset with very numerous projections; average diam. 250$\mu$. Spores, several hundred in number, subcylindrical; rounded at both ends, average dimensions 39$\times$8.5–10$\mu$.

On old bones and other decaying animal matter.— Massachusetts, Connecticut.

This remarkable species, which is the prince of its kind and one of the most beautiful of the Hyphomycetes seems to be not uncommon about New Haven, growing with great luxuriance on old bones, etc. in woods, appearing after rains in patches of considerable size, at first sight not unlike a vigorous growth of some large Mucor. A few specimens of the same species once followed a culture of Basidiobolus on frogs dung in Cambridge: but, like *R. elegans*, I have been unable to cultivate it on a large scale except on substrata where its mycelium was already growing, and all sowing and attempted cultures of its spores in water or in nutrient solutions have failed entirely.

The *R. nigripes* of Constantin which occurs upon *Peziza arenaria* approaches it in bearing a large number of spores: but is at once distinguished by its smaller size, dark color and by the absence of the peculiar constriction below the head present in our species.

**Sigmoideomyces** n. gen.

Fertile hyhae erect, septate, growing in sigmoid curves, intricately branched, the main branches subdichotomous or falsely dichotomous, the ultimate branches sterile. Spores solitary, thick walled, borne on the surface of spherical heads. Heads borne at the apex of short lateral branches which arise from opposite sides of certain cells in the continuity of the hyphae.

**Sigmoideomyces dispiroides** n. sp.—Plate IV, figs. 15–18.

Fertile hyphae forming brownish yellow tufts about 1 mm. high, coherent through the interlocking of the numerous curved branches, the main axis (and its principal branches) growing in a more or less regular succession of sigmoid curves, giving off the main branches from the convex side of each curve, the cell which bears the branch also producing a short, nearly cylindrical, lateral outgrowth from either side, in a plane at right angles to that of the branch. Each of these outgrowths is septate near its base and apex and terminated by a perfectly spherical head. Ultimate branches curved and sterile, sometimes greatly elongated, giving rise to a succession of still smaller curved sterile branches from their convex sides. Heads 38$\mu$ (35–45$\mu$) in diameter. Spores broadly elliptical to nearly spherical, yellowish, finely echinulate, 16×17$\mu$.

On rotten wood. Burbank, E. Tennessee.

A single specimen of this peculiar plant was collected at Burbank on the under side of a moist log on which it produced a few scattered tufts of varying size. The fungus had reached maturity, and owing to the fact that it separates with great readiness at the septa, it was impossible to determine whether the fertile hyphae were produced from a few fine filaments which could be seen running upon the wood at the base of some of the specimens examined, or whether the sterile hyphae had wholly disappeared. The heads also break off when mature, even while the spores are still *in situ*, carrying with them the last cell of the short stalk which bears them. A certain number of the ultimate sterile branches are contin-

ued into sometimes greatly elongated simple septate filaments which may be seen with a hand lens projecting here and there beyond the general surface of the tuft.

The genus bears much the same relation to Oedocephalum that Dispira bears to Aspergillus, and the somewhat similar type of growth and branching seen in VanTieghem's species has suggested the specific name.

SYNOPSIS OF THE DESCRIBED SPECIES OF OEDOCEPHALUM AND RHOPALOMYCES.

*Oedocephalum albidum* Saccardo: Michelia, II., p. 288, (*sub* Haplotrichum), Fungi Italici, plate 805. The hyphæ of this species are described as hyaline and figured as brownish; fertile simple, rarely branched. Spores spherical or broadly elliptical, 7–10$\mu$ in diam., yellowish. On roots of lemon.

*O. album* Preuss: Fung. Hoyersw., No. 108: Sturm's Flora, Taf. 63. This is referred to *O. glomerulosum* by Harz, but is figured with round spores. Otherwise the description and plate furnish no clue to its identity.

*O. alienum* Preuss: l. c., No. 109, l. c. Taf. 63. This species is said to be distinguished from the preceding by the fact that the head lacks the warts and furrows present in *O. album*. The spores are also figured as spherical and the species is otherwise equally unrecognizable.

*O. aurantiacum* Cooke: Grevillea, vol. V, p. 147. Forms orange colored orbicular patches. Hyphæ short, fasciculate, septate, hyaline, above spherical and papillate. Spores spherical, orange-colored, smooth, (no measurements). On leaves of forest trees, India.

*O. badium* Von Müggenberg; Myc. Beiter., in Verhand. d. k. k. zool. bot. Gesell. in Wien, 1874. The heads of this species are said to produce longish cells, which are covered with muricate brown spores $7 \times 10\mu$. It is therefore not an Oedocephalum.

*O. byssinum* Saccardo: Sylloge, IV., p. 49. Bonorden Abhand. a. d. Geb. d. Mycol. II., p. 95, Taf. 1, fig. 12, *sub* Periconia. Karsten Symb. a. Myc. Fenn., 1888, XXVI, 4. p. 49, subspecies *herbariorum*. Hyphæ hyaline, hardly septate. Spores spherical. Karsten's sub-species has spores perfectly spherical, verruculose 12–14$\mu$ in diam. Fertile hyphæ 2 mm. $\times$ 15 – 20$\mu$. Heads becoming yellowish. The type seems very near *O. albidum* Sacc. from the description. On decaying leaves.

*O. crystallinum* Cesati. This is said by Saccardo to be described on "p. 299" of the Botan. Zeitung, and figured in Hedwigia, 1, Taf. IV. fig. 3. I have not seen the original description. On Taf. IV, Vol. II, of Hedwigia fig. 3 represents an Oedocephalum which might be *O. glomerulosum*, but it is too coarse and ill-drawn to give any idea of its identity. A tedious search in the accompanying text shows no reference to it. According to Saccardo, the spores are hyaline, oblong, ovoid, becoming subochraceous. On Sporidesmium: distributed in in Klotsch, Herb. Viv. Myc., 1974.

*O. dichotomum* Preuss: Fungi Hoyersw. No. 271. This is peculiar for its successively dichotomous branches, which terminate in a head bearing brownish, finely muriculate globoso-ellipsoid spores. On Polyporus flavus.

*O. fimetarium* Riess: see above sub *O. pallidum* (B. & Br.) Cost.

*O. glomerulosum* (Bulliard) Saccardo: see above.

*O. hyalinum* Saccardo: Sylloge IV, p. 49, Bonorden, Abh. a. d. Geb. d. Mycol. II, p. 95, Taf. I, fig. 11, *sub* Periconia. Hyphae colorless, hardly septate. Head yellowish. Conidia small, spherical, hyaline. On decayed leaves. This seems too near *O. albidum* Sacc. and *O. byssinum* (Bon.).

*O. lacticolor* Berkeley & Broome: Ann. & Mag. of Nat. Hist., May, 1865, 3d Ser., Vol. XV, p. 403, Pl. XIV, fig. 12. Brick red. Fertile hyphae simple. Spores figured as elliptical and verrucose; described as spherical, granular, 15–20$\mu$ long, with a basal appendage. On cow dung. The figures are coarse and indefinite, but the species seems quite distinct.

*O. pyriforme* Saccardo: Sylloge, p. 49, Bonorden Handl. d. Allg. Mycol., p. 113, Taf. IX., fig. 196, *sub* Periconia. The hyphae of this species are described as aseptate. The spores are spherical or oval (figured as echinulate or verruculose) slightly blackish, hyaline. The head is grey green, and the whole plant in gross appearance resembles Penicillium glaucum. On Polyporus flavus.

*O. Preussii* Saccardo: Sylloge, Vol. IV., p. 49, Preuss, Fung. Hoyersw., No. 104, *sub* Periconia alba. Hyphæ white, septate. Spores subglobose, smooth. This species can hardly be identified from the description. On decaying leaves.

*O. roseum* Cooke: Grevillea, Vol. I, p. 184, ibid Vol. II., Pl. 22, fig. 8. "Rose pink, effused, or in minute punctiform

tufts collected together in irregular patches. Threads equal. Head subglobose: spores ovate or oval, smooth, attached by a slight apiculus. Cooke, Exs., No. 550. On old paper and rags." The description and figure corresponds closely with some varieties of *O. glomerulosum.*

*O. sulphureum* Cooke & Massee: Grevillea, Vol. XVII, p. 3. "Tufts hemispherical or confluent, sulphur colored. Threads septate, dichotomous, globosely capitulate at the apex, papillate, conidia globose, hyaline (3–5$\mu$ diam). Epispore smooth. On rope."

*Rhopalomyces candidus* Berkeley & Broome: see above sub *Oedocephalum pallidum* (B. & Br.) Cost.

*R. cervinus* Cooke: see above sub *Oed. pallidum* (B. & Br.)

*R. cucurbitarum* Berkeley & Ravenel: see above.

*R. elegans* Corda: see above.

*R. nigripes* Costantin: Bull d. l. Soc. Bot. d. France, 1886 p. 442. Les Mucéd. Simples, p. 37, fig 5.

Head and fertile hyphæ brown. Head 28–30$\mu$ in diam. Spores brown, elongate, rounded at one extremity, pointed at the other. 25–34×8–9$\mu$. On Peziza arenaria.

*R. pallidus* Berkeley & Broome: see above sub *Oedocephalum pallidum.*

The writer desires to express his indebtedness to the kindness of Mr. Massee in communicating notes on Berkeley's types, as well as to Prof. Farlow, for the privilege of examining several of the works consulted.

*New Haven, October, 1890.*

EXPLANATION OF PLATE III.

*Rhopalomyces elegans* Corda.

Fig. 1. Single fertile hypha with rhizoids ×68. Fig. 2. Four spores ×464.

*Rhopalomyces strangulatus*, n. s.

Fig. 3. Fertile hyphæ natural size (as reduced.) Fig. 4. Fertile hypha ×68. Fig. 5. Fertile head mostly denuded of spores×232. Fig. 6. Base of fertile hypha showing rhizoids ×232. Fig. 7. Five spores ×464. Figs. 8–9. Early stages in formation of fertile hyphæ ×232.

EXPLANATION OF PLATE IV.

*Oedocephalum glomerulosum* (Bull.) Sacc.

Fig. 1. Three spores ×696.

*Oedocephalum pallidum* (B. & Br.) Cost.

Fig. 2. Fertile head of form on dead wood ×464. Fig. 3. Abnormal spore production at apex of fertile hypha ×464. Fig. 4. Five spores of form on dead wood ×696. Fig. 5. Four spores of form on paper ×696. Fig. 6. Fertile hypha of form on horse dung (*O. fimetarium* Riess) × 464. Fig. 7. Five spores of form on horse dung ×696.

*Oedocephalum echinulatum*, n. s.

Fig. 8. Portions of fertile hyphæ showing inside of branching ×348. Fig. 9. Fertile head proliferating to form several secondary heads ×348. Fig. 10. Two fertile heads, one young, the other mature ×464. Fig. 11. Two spores ×696.

*Oedocephalum verticillatum*, n. s.

Fig. 12. Sterile and fertile hyphæ, showing verticillate habit ×232. Fig. 13. Single head ×464. Fig. 14. Three spores ×696.

*Sigmiodeomyces dispiroides*, n. g. et n. s.

Fig. 15. Fragment taken from a fertile tuft, showing sigmoid habit; fertile heads denuded of spores when they have not fallen off entirely ×136. Fig. 16. Fragment bearing two pairs of fertile heads, one of which has fallen off ×464. Fig. 17. Spore ×696. Fig. 18. Spore in optical section ×696.

## New Grasses.

GEO. VASEY.

**Sporobolus pilosus,** n. sp.—Perennial, from thick roots; whole plant pale green: culms cespitose, rigid, erect, about 1½ ft. high, leafy, particularly at the base, mostly simple, sheaths smooth, the uppermost sheathing the base of the panicle, the lower crowded and flattened; ligule inconspicuous; the throat, margin and both sides of the lower blades pilose, the upper ones involute and attenuated to a long point, shorter than the culm: panicle terminal, spike-like, 2 to 3 inches long, close, the lower part included in the sheath; spikelets 2½ lines long, smooth, the lower empty glume ¼ shorter than the upper, which equals the fl. gl. and palet, all obtuse.—Resembles S. asper, which has the leaves longer than the culm, both empty glumes shorter than the flower, and the leaves smooth or not pilose. Collected in Kansas, by B. B. Smythe.

**Bouteloua uniflora,** n. sp.—Perennial: culms 12 to 15 inches high, slender: culm leaves 4, the upper sheathing the base of the panicle, 1 line wide, the lower 3 to 4 inches long, rigid, becoming involute; ligule a ring of short hairs: panicle racemose-spicate, about 4 inches long, with 35 to 50 spikes, which are about 4 lines long, and but one flowered; lower empty glume linear-oblong, hardly half as long as the upper, which is between 3 and 4 lines long, acuminate, conduplicate, entire and scabrous on the midrib; flowering glume about

2½ lines long, and the palet about 1½ lines; sometimes a small, weak, threadlike sterile pedicel present, sometimes wanting: immediately below the flower is the rachis, which is linear and about two-thirds as long as the spikelet.—Collected in Texas, by G. C. Nealley, in 1890. Related to B. racemosa, but differs in its smaller size and smaller, one flowered spikes.

ANDROPOGON MACROURUS, var. **pumilus,** n. var.—Perennial dwarf, tufted; culms 6 to 10 inches high, branching from the base, and terminating in a cymose panicle; leaves 3 to 6 inches long, longer than the internodes, smooth, the sheaths enclosing the lateral flowering branches, sparingly hairy at the throat; branches numerous at the upper sheaths, each subdivided, the sheathing bract rather longer than the pair of terminal spikes, which are 1 to 1¼ inches long, and with 10 to 12 spikelets; pedicel slightly hairy below the bract.—A remarkable variety, collected in Western Texas by G. C. Nealley.

*Department of Agriculture, Washington, D. C.*

## BRIEFER ARTICLES.

**Actinella (Hymenoxis) Texana,** n. sp.—A small slender annual 5 to 15 cm. high, branching at base; leaves mostly radical, 3-nerved, oblong and tapering at base, entire or few-toothed; those of the stem narrower and toothed, becoming linear and entire above: heads small (4 to 6 mm. high): involucral bracts in 2 series; the outer ones about 8, rigid and keeled, united at base: rays minute, not projecting beyond the bracts: achenes pyramidal, 1 mm. long: pappus of 5 oval paleæ with aristate acuminations very conspicuous in mature heads. Collected by F. W. Thurow, near Hockley, Texas, 1889 and 1890; also mounted on a sheet with *A. odorata* (No. 742) of Palmer's 1879–80 collection from S. W. Texas. This little plant is evidently an Actinella, although it differs widely from any known North American form. The minute rays, not noticeable to the naked eye, and hence easily overlooked, under the lens suggest a relationship to the rayless species of South America. As presented by Dr. Gray in the Synoptical Flora, there is nothing to keep our species out of the section *Hymenoxis*. The involucre is very similar to that of *A. Rusbyi*, but in other respects the plant is very different. The achenes and pappus are very

similar to those of *A. linearifolia*, but the involucre is very different.—JOHN M. COULTER AND J. N. ROSE.

**Anæsthetics and Transpiration.**—Mr. C. P. Lommen finds that Jumelle's results regarding the influence of anæsthetics upon transpiration in green plants may be obtained quantitatively by the simple method of weighing on the analytical balance at intervals of a few hours. Sprigs of *Selaginella rupestris* Spring, were employed in a series of experiments, and the percentage of water lost under glass in darkness and in light, with and without ether, corresponded with Jumelle's general results as chronicled in the *Revue Generale de Botanique*, October, 1890. This affords a very simple and easy method of demonstrating the relation between transpiration and assimilation.—CONWAY MACMILLAN, *University of Minnesota.*

## EDITORIAL.

Most advanced college students now-a-days are expected to secure some personal freedom of judgment by the independent investigation of a suitable subject. The larger part of such efforts do not rise to to the plane of an addition to recorded knowledge, but serve at the time to assist the student in his mental development. A strong student with the necessary preliminary training, however, may do work of scientific value, if it is properly planned and directed by the teacher in charge. But whether of value or not from the scientific point of view, if reasonable success is attained the work must be well outlined at the start, and to do this often taxes the teacher's resources. If he is interested in mycology, the natural tendency is to turn students into that line of work, if in embryological development, into that work, and so on. This secures the best assistance from the teacher, but does not always bring to light the pupil's special talents or aptitude where he is most likely to excel. An inability to successfully manage the delicate manipulations required for high class histological work, stands in the way of fair success for many students, and for several years past our laboratories have chiefly cultivated this field of research. The work outlined for the student should be adapted not only to his knowledge and maturity of judgment, but to his skill as a manipulator, and to do this the selection must be made through a wide range of topics. There is a field of research of absorbing interest, crowded with unsolved problems, and in which the use of the microscope can be largely dispensed with, hitherto much overlooked, and that is the physiology of movement in plants. The changes in position of leaves, stems and roots due to gravitation, heat, light,

moisture and various internal agencies, and other similar subjects possess all the elements required for a good thesis. There are excellent grounds for the belief that vegetable physiology will soon claim as much attention from American universities as minute anatomy did a short time since. At any rate, here is a field to be kept in mind in deciding upon themes for independent investigation.

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## CURRENT LITERATURE.

### A General Treatise upon Fungi.

The fungi have presented many obstacles to a satisfactory treatment within the compass of a single volume, among which are the very large number of diversified forms ranging through a long and intricate series, the obscure polymorphic nature of many of the species, the much reduced structure and curtailed life cycle due to dependence upon organic food supply, and imperfect knowledge of physiological and biological phenomena. Of the several divisions of the subject, systematic, morphological, biological and physiological, we have had more or less well written general accounts of each, decreasing in number and importance in the order named, except of the last. For a knowledge of the physiology of fungi the student has been obliged to hunt up the scattered papers in journals and society proceedings, and incidental references in works upon other subjects. A treatise, therefore, which gives a satisfactory survey of the whole subject of fungi, with the several parts duly apportioned, can not but meet with hearty welcome. Such a work is Zopf's recently published volume on the fungi in their morphological, physiological, biological and systematical relations.[1] The author is well known by his able works upon the lower forms of life and by his numerous important researches.

Of the 500 pages in the volume 115 are devoted to morphology, 110 to physiology, 56 to biology and 204 to classification and development. Upon opening to the first page one finds that the author proposes to include in the work only the true fungi (Eumycetes), and to exclude the bacteria (Schizomycetes) upon morphological grounds as well as of expediency. No mention is made of the slime-molds (Myxomycetes) except in a footnote where they are said to be animals and not plants. The author has given much attention to these outlying groups of organisms and published several monographs upon them, and their

[1] ZOPF, WILHELM.—Die Pilze in morphologischer, physiologischer, biologischer und systematischer Beziehung. pp. xii, 500. figs. 163. Roy. 8 vo. Breslau, Ed. Trewendt: 1890.—M. 18.

exclusion from the present work is indicative of a conservative course of treatment.

The morphological part comprises an account of the vegetative organs, organs of fructification including the mechanical contrivances for freeing the spores, the structure and formation of the cell, and its union into systems.

The physiological part opens with seventy pages upon the chemistry of the fungi, which contain a vast amount of information, as may be judged by the fact that there are nearly three hundred footnote references to literature. The part is continued in an account of respiration, development of heat and light, external forces influencing life processes, agents harmful to life, phenomena of movement such as heliotropism, hydrotropism, geotropism, rheotropism, movements due to contact and to chemical and electrical stimuli, and finally nutation and hygroscopic movements.

The biological part treats of saprophytism and parasitism, the means of infection, effect of the parasite upon the host, symbiotism, and the enemies of fungi.

In the systematic part the following classification is used:

I. Phycomycetes
  *a* Chytridiaceæ (*Olpidiaceæ*, etc.)
  *b* Oomycetes (*Saprolegniaceæ*, *Peronosporeæ*, etc.)
  *c* Zygomycetes (*Mucoraceæ*, *Entomophthoraceæ*, etc.)

II. Mycomycetes
  *a* Basidiomycetes (*Tremellineæ*, *Polyporeæ*, *Agaricineæ*, *Lycoperdaceæ*, etc.)
  *b* Uredineæ.
  *c* Ustilagineæ.
  *d* Ascomycetes (*Saccharomycetes*, *Erysipheæ*, *Tuberaceæ*, *Sphæriaceæ*, *Pezizaceæ*, etc.)

The work is copiously illustrated with well drawn figures, which, however, are not so well engraved and printed as one would expect. A good index of illustrations and another of subjects closes the volume.

Altogether no work of equal importance has heretofore appeared on the general subject of fungi, and its speedy translation into English is much to be desired.

### The Silva of North America.

North America has always been noted for its forests, and permanent record concerning them should be made before they have been more extensively devastated. The only work upon the subject, giving detailed

descriptions, has been that of Michaux, supplemented by Nuttall, but this was necessarily incomplete. In the great work[1] now undertaken by Professor C. S. Sargent, the whole subject is to be presented in 12 quarto volumes, superbly printed and illustrated, the first of which has now appeared. Professor Sargent's connection with the forest volume of the 10th census is well known, and no one more competent could have been selected to undertake the work. That the plates will be all that can be desired is evidenced by the fact that the drawings are to be made by C. E. Faxon and engraved by Philibert and Eugène Picart. North American botanists are to be congratulated upon the appearance of this great work, and while its price will put it beyond many private purses, it should find its way into all public libraries, and should be considered a part of the equipment of every botanical department in our colleges. The definition of "trees" is a difficult one, and the author very rationally proposes to follow habit rather than size, a division which will include 422 species, besides numerous varieties. In nomenclature the rule adopted is to use the oldest generic name applied by Linnæus in the first edition of the "Genera Plantarum," published in 1737, or by any subsequent author, and the oldest specific name used by Linnæus in the first edition of the "Species Plantarum," published in 1753, or by any subsequent author, without regard to the fact that such a specific name may have been associated at first with a generic name improperly employed. Thirty-three species are included in this first volume.

### Plants as rock-makers.

PLANTS have long been known to play an important part in the accumulation of travertine, though we doubt whether sufficient credit has been given to vegetation as a geological agent in this matter. In an elaborate memoir[2] by Walter H. Weed, forming part of the ninth annual report of the director of the U. S. Geological Survey, it is shown not only that very large deposits of travertine are due to the aid, direct and indirect, of vegetation, but also that the extensive deposits of siliceous sinter in the Yellowstone geyser region are in large part due to the separation of the silica from the water by plants.

[1] SARGENT, CHARLES SPRAGUE.—The Silva of North America, a description of the trees that grow in N. Am. exclusive of Mexico, Vol. I. Magnoliaceæ Ilicineæ pp. ix. 119. 50 plates, large 4to, Boston and New York: Houghton Mifflin & Co., 1891.—$25 per volume.

[2] WEED, WALTER HARVEY.—The formation of travertine and siliceous sinter by the vegetation of hot springs. pp. 619-676. 9th Ann. Rep't, U. S. G. S. figs. 5. pls. 10. Imperial 8vo. Washington: Government Printing Office, 1890.

Just how this elimination of silica is accomplished Mr. Weed does not say, and the matter really lies outside his province. Algæ are the chief agents in this work, and in the cooler waters at some distance from the springs mosses also assist. Cladothrix gypsophila, Mastigonema thermale, Leptothrix laminosa, and Leptothrix sp.? are the chief filamentous forms found growing in the hot waters. Various diatoms, Denticula valida in particular, eliminate silica from the tepid waters of the marshes about the Hot Springs, and their dead tests make up the bulk of the ooze which forms the soil of these marshes. The moss found in the warm waters was Hypnum aduncum var. gracilescens. The memoir is an interesting contribution to the knowledge of vegetation as a geological agent.

### Minor Notices.

WITH THE APPEARANCE of Part V, devoted to Pteridophytes, Professor John Macoun's Catalogue of vascular Canadian Plants has been completed. It has been very handsomely done and the painstaking care so evident through it all has made it a mine of information concerning the Canadian flora. The present part brings up the generic numbers to 764, the specific to 3,054. A large appendix brings together additions and corrections to Parts I–IV, the results of all monographic work done since the beginning of the catalogue being included. It is promised that Part VI, soon to appear, will include Characeæ, Musci, and Hepaticæ, about 1,000 species in all. The part is rounded out by a complete index to all the parts, and the five will make a very complete and compact volume.

ALONG WITH the preceding comes a list of Canadian Hepaticæ, by Wm. Hy. Pearson, published in the same style, and containing 12 full page plates.

## OPEN LETTERS.

### The word "Biology."

An open letter from a "Prominent Zoologist" brings a breath of "*Bion*" into the October *Gazette*. In it, an original and characteristically unsearchable defence is proposed for the current etymological piracy *in re* the word "biology." It is probably the same "prominent zoologist"—if one may judge by kinship of orthographic recklessness—who presents, editorially, in the Nov. *American Naturalist* a similar sin against rational use of terminology. The argument perpetrated by the GAZETTE letter and perpetrated in the *Naturalist* editorial is as follows: "Zoologists were the first to study life; therefore they have a prior right to the word *biology*." The truly "biological"

lapse in the major premise is not altogether unapparent to those who recall the fostering care of botanists—such as Darwin for example—while putting the infant industry of the zoologists on its feet. Why, even Huxley looks upon his long zoological training-course as a means of fitting him for extended study of the Gentians. An additional and quite unanswerable argument is brought forward, however, in the *Naturalist* editorial. "On a broad etymological basis the use of the word by zoologists is wrong," observes the writer. And then he straightway insists upon the right to use it. The peculiar appropriateness of an incorrect word for a one-sided, incorrect science is felt by us all. Indeed, as an additional evidence of true "biological" wrath at the philological pharisees and purists, the "prominent zoologist" proudly parades in his GAZETTE letter a Greek termination which we sincerely hope is not to be found elsewhere. At least the dictionaries, being written on the much despised "broad etymological basis" may be relied upon to exclude it.

Apparently the trouble with the prominent zoologist is this: In college days he was probably brought under the influence of Dr. Mark Hopkins, of venerated memory, and he has adopted one of the contestable *dicta* of his early philosophic mentor. It was a pleasing idiosyncrasy of Dr. Hopkins to insist that a "profound abyss" yawned between plants and animals. "Certainly," thinks the disciple. "'Life' characterises animals and, since there is the profound abyss I learned about, plants must be in a condition of partial paralysis and the biologist should shun them." This is what the editor of the *Naturalist* means when he speaks of the "living side" of the plant-world as if there was any side *not* alive. The same confused, altho Hopkinsesque, notions of plants and animals so characteristic of half-biologists, are shown again in the *Naturalist* editorial when it is said—"fully one-half of the teachers of botany are unable to give any of the living side of their subject. * * * The zoologist teaches *all that is taught* of life." The intimation is plain that the "living side" taught by the other half of the botanists is very different from the "life" (or in the *original* Greek *Bion*) which zoologists wish to claim as their peculiar province. A little less slavish knuckling down to the Mark Hopkins school, a little more Greek and a good deal more biology would make the "prominent zoologist" something of an orthographic authority.—AN OBSCURE AND ORDINARY BOTANIST.

### Labeling specimens for the herbarium.

The usefulness of the herbarium is largely determined by the excellence of the labelling. Bearing this in mind, I cast about for a method of labelling the specimens in my herbarium, and, finally after having read of the methods used here and there and finding none that suited me exactly, I thought of the following way which has proved one of so great neatness, excellence, fulness and easeness as to lead me to mention it for the instruction of others who desire to render their collections more serviceable. In labelling my herbarium I used the printed names and descriptions clipped directly from the revised Manual. I labelled my shelves with the printed ordinal name, but could not use the descriptions. The genus covers have the generic

name and description neatly pasted upon them. Each species paper has the generic initial and the specific name and description pasted upon it. This method virtually converts my herbarium into an invaluable *illustrated Gray's Manual*, and in my opinion is more handy than it would have been had I adopted the methods currently advocated.—Wm. E. Andrews, *Blackburn University, Carlinville, Ill.*

## NOTES AND NEWS.

Mr. E. J. Hill is writing a series of articles for *Garden and Forest*, on the autumn flora of the Lake Michigan pine-barrens.

M. W. Beyerinck has succeeded in isolating some of the very small algæ by a modification of the gelatine-plate process used by bacteriologists. Cf. *Bot. Zeit.*, 48, 725.

The *Journal de Botanique* (Nov. 16), contains an account of the *Piperaceæ* of Ecuador, New Grenada, and Peru, in the collection of M. Ed. André, with descriptions of many new species, by M. C. De Candolle.

M. E. Bourquelot has examined the sugar in a large number of species of Boletus, as well as some Amanitas. He finds the sugar when the plants are young to be almost always tréhalose (2.7—7.8 per cent.), which is replaced with increasing age by mannite.

Dr. Thomas Morong has returned from his long South American trip, and has been appointed curator of the herbarium of Columbia College. Mr. Morong is to be congratulated upon his successful trip, and upon the very congenial and fitting position that he found awaiting his return.

A very interesting discovery of an arctic plant in Alpine regions, was made last summer by Professor M. A. Carleton, of Garfield University, Wichita, Kansas. *Douglasia arctica* Hook., known only from our northwestern arctic seashores, and poorly known even from that locality, was discovered on Pike's Peak, Colorado.

An elevation of temperature of 20° C., due to growth was observed by H. Devaux (*Bull. Soc. Bot. de France*, xxxvii, 168) in a pile of stored potatoes that had produced sprouts a foot or so long. The surrounding air indicated 18 to 19° C., the tubers on the outside of the pile 1 or 2 degrees higher, and at the center of the pile, 2 meters from the surface, the temperature stood at 39° C.

MM. Schloesing, Jr. and Laurent have shown by a direct method that the Leguminosæ can fix free nitrogen. Instead of determining the amount of N in the seed and subsequently the amount in the crop, they measured the N, O, and $CO_2$ introduced into a chamber with growing plants. After three months they again determined these gases, when the N was found to have diminished. Every precaution seems to have been taken against error.

A CANADIAN Botanists' Correspondence association was formed in December last, composed of botanists who collect and preserve specimens of the Canadian flora, and who are willing to afford information and assistance to others in the study of botany. A variety of other good objects is set forth in their constitution, and the whole movement deserves hearty support and encouragement. The officers who constitute the executive of the association are John Dearness, London, Ontario, chairman, and J. A. Morton, Wingham, Ontario, secretary.

AT THE LEEDS meeting of the British Association, the subject of teaching botany in the schools was discussed. Professor Marshall Ward introduced it, and in the discussion that followed it was evident that British botanists are becoming aroused to the attitude that their American brethren have held for many a long day. They agreed "that it is time to leave the blind worship of facts, and instead of measuring a scholar's progress by the amount of dogmatic information imbibed and put into an examination paper, to look to his understanding of the relation between facts and the intelligence with which he describes what he sees." We had imagined that any sentiment contrary to this had gone out with the coming in of laboratory methods.

VINCENT CHMIELEWSKY has reëxamined the behavior of Spirogyra in conjugation, and particularly the changes in the formation and growth of the zygospore. He finds that the protoplasm of the male cell acts only as a vehicle for the transportation of the nucleus, the essence of the act of fertilization being the union of the male and female nuclei. The chlorophyll band or bands, pyrenoids, etc., instead of uniting with the corresponding structures of the female cell, as has been believed, become disorganized. Traces of these disorganized parts remain in the zygospore even till germination. Only the persistent structures of the female cell enter the tube which is formed on the germination of the zygospore. These observations, while differing very materially from those of other observers, coincide more closely with what we know of fertilization in other plants.

IN THE LAST *Bulletin of the Torrey Botanical Club* (Dec.) Dr. N. L. Britton presents his third contribution entitled, "New or Noteworthy N. Am. Phanerogams." *Ranunculus Porteri* is a new species from Henry's Fork, collected some years ago by the Hayden survey. The somewhat unsatisfactory label reads very much as though the plant had been collected in 1872, when J. M. Coulter was the collector. *Capsella divaricata* Walp. is thought to be identical with the Old World *C. procumbens* L.; it is suggested that *Hypericum Canadense* L., var. *majus* Gray is worthy of specific rank; *Calandrinia pygmæa* Gray is made *C. Grayi* Britt. on account of an earlier Australian species bearing the former specific name; *Lotus Helleri* is a new species disentangled from *L. Americanus* Bisch. (*Hosackia Purshiana* Benth.); *Spirwa Virginiana* is a new species from W. Va.; and a new Cyperus from Key West is described.

THE PROCEEDINGS of the eleventh meeting of the Society for the Promotion of Agricultural Science, held last August in Indianapolis, have been distributed. The most notable botanical article in the volume is the index to the common names of grasses, compiled by Prof.

Lamson-Scribner. It covers eighteen pages, and appears very complete. The other botanical articles are short, and part are in abstract. They are as follows: Preliminary notes upon the rotting of potatoes, by T. J. Burrill; Scab of wheat heads, by Clarence M. Weed, describing a Fusisporium; Recent observations on black rot of the grape, and comparative test of copper preparations for black rot of the grape, by B. T. Galloway; Some fungus root diseases, by L. H. Pammel. The abstracts are: Forage problem of the plains, by C. E. Bessey; Rots of the sweet potato, by B. D. Halsted; Cucurbita an American genus, by E. L. Sturtevant; Some biographical factors in the nutrition of plants, by M. Miles.

The Indiana Academy of Sciences met at Indianapolis December 29–31. The botanical papers announced were as follows: *Stanley Coulter*, Preliminary note on the genus Polygonum, Aberrant fruit of Juglans nigra, Value of minute anatomy in plant classification; *D. T. McDougal*, Aberrant forms of Juglans nigra; *David M. Mottier*, Notes on the apical growth of liverworts, Notes on the germination of spores of Notothylas; *J. C. Arthur*, A remarkable oscillating movement of protoplasm in a Mucor, Accelerating germination by previous immersion of the seed in hot water; *Henry E. Seaton*, Notes on Guatemalan Compositæ; *E. M. Fisher*, Parasitic fungi of Indiana; *John Morgan*, Circulation of sap; *J. N. Rose*, Distribution of Peucedanum in N. Am., Plants collected by Dr. Palmer in Arizona in 1890; *D. H. Campbell*, Comparative structure of the roots of Osmunda and Botrychium, Notes on the prothallium of the Osmundaceæ; *H. L. Bolley*, Notes on a new Puccinia, On the manufacture of plant infusions for the culture of bacteria; *W. P. Shannon*, The occurrence of Veratrum Woodii in Decatur Co., Ind.; *Joseph H. Tudor*, Some features in the occurrence of Viola pedata, var. bicolor; *W. J. Spillman*, Preliminary list of Knox Co. plants, Introduction of noxious weeds; *Katherine E. Golden*, Weight of seed in relation to production; *John M. Coulter*, Biological surveys, The flora of Texas.

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